

# Lab Refraction and Reflection

name:

partners name

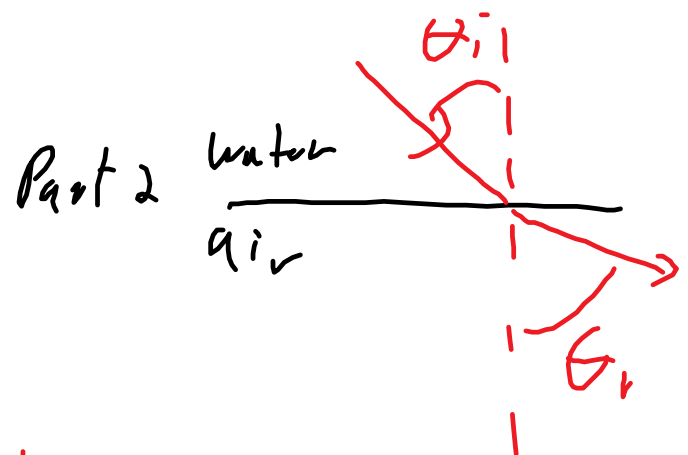
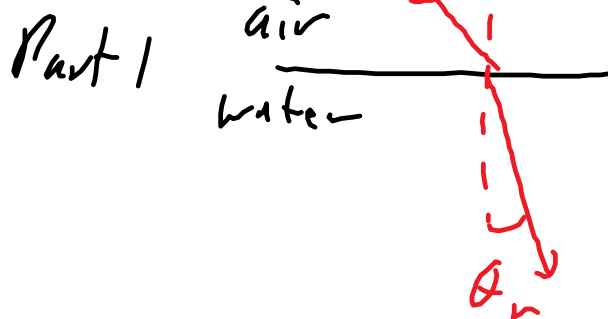
Purpose:

Procedure: refer to lab manual p45 and 46.

Note: record angle of reflection under notes.

Graph  $\sin \theta_i$  vs  $\sin \theta_r$  using a spreadsheet program

Hypothesis: light ray  $\theta_i$  Normal



index of refraction,  $n$

$$n_{\text{air}} = 1.00$$

$$n_{\text{water}} = 1.33$$

Snell's Law:

observations

# Part 1: Air to Water

Angle of incidence $\theta_i (^{\circ})$	Angle of refraction $\theta_r (^{\circ})$	$\sin \theta_i$	$\sin \theta_r$	$\frac{\sin \theta_i}{\sin \theta_r}$	Notes
0					
10.0					
20.0					
30.0					
40.0					
50.0					
60.0					
70.0					
80.0					
90.0?					

max angle

## Part 2: Water $\rightarrow$ air

$\theta_i$	$\theta_r$	$\sin \theta_i$	$\sin \theta_r$	$\frac{\sin \theta_i}{\sin \theta_r}$	Notes

max angle

## Analysis

Graph  $\sin \theta_i$  vs  $\sin \theta_r$  using a spreadsheet program

Answer the lab questions p45 and 46

Conclusion

Sources of uncertainty

On the spreadsheet:

Input your data

To calculate the sin of the angles in column A use

`=SIN(A2*2*3.14/360)`

Click on the corner and drag down to apply to all data

To graph click and drag to select the columns and click "scatterplot" graph (no lines)

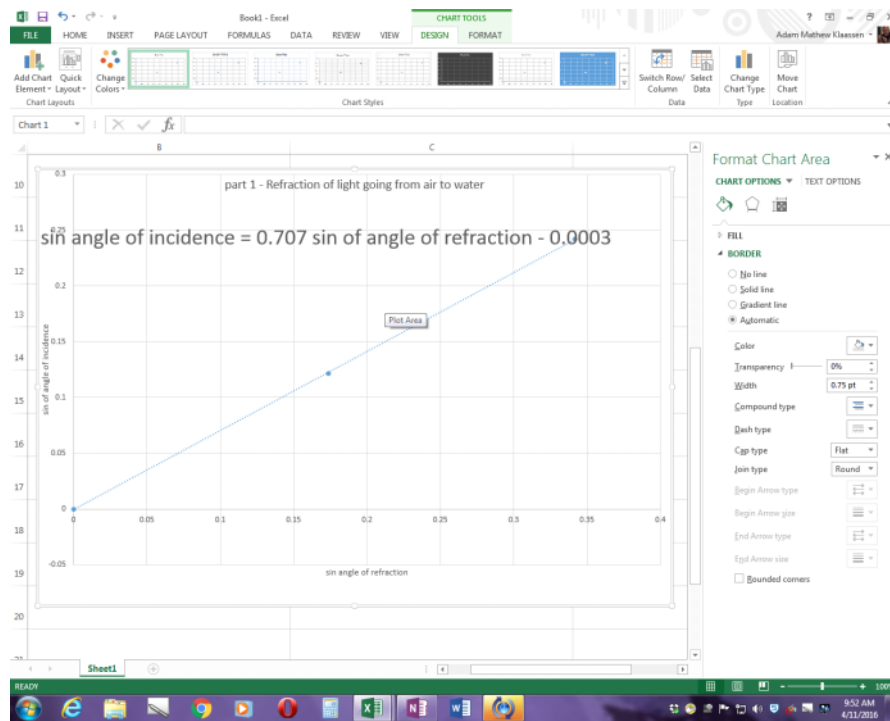
Right click on a data point and select "add trendline" linear and display on chart

Change y and x on the equation to sin angle of incidence and sin angle of refraction

Increase font

Add labels to axis and title\

Should look like:



Graphs due next class - print out and show me  
Last class to hand in field trip form + money  
before I take off marks on assignment